

GCSE MATHEMATICS
 MARK SCHEME – Specimen paper (Linear) Higher Paper 3
 Issue 2

Questions	Working	Answer	Mark	Notes			
1		14	3	M1 for $5 \times 4 (= 20)$ or 3×2 or attempt to divide diagram into rectangles M1 “20” – “6” or addition of parts A1 cao			
2 (a)	$3 \times 4 + 4 \times -5 = 12 - 20$	-8	2	M1 substitution eg. 3×4 and 4×-5 or 12 and -20 A1 cao			
(b)	$3 \times 2^2 - 5$ $3 \times 4 - 5$	7	3	M1 substitution eg $3 \times 2^2 - 5$; do not accept $32^2 - 5$ M1 $3 \times 4 - 5$ or $3 \times 2 \times 2 - 5$ or $12 - 5$ A1 cao			
3 (a)	<table style="width: 100%; border: none;"> <tr> <td style="text-align: right; padding-right: 20px;">$\begin{array}{r} 679 \\ \underline{28} \\ 5432 \\ \underline{13580} \\ 19012 \end{array}$</td> <td style="text-align: center; vertical-align: middle;">or</td> <td style="text-align: left; padding-left: 20px;">$\begin{array}{r} 28 \\ \underline{679} \\ 252 \\ 1960 \\ \underline{16800} \\ 19012 \end{array}$</td> </tr> </table>	$\begin{array}{r} 679 \\ \underline{28} \\ 5432 \\ \underline{13580} \\ 19012 \end{array}$	or	$\begin{array}{r} 28 \\ \underline{679} \\ 252 \\ 1960 \\ \underline{16800} \\ 19012 \end{array}$	190.12	3	M1 for an attempt to multiply the units and tens, or correct partitioning M1 for completely correct method (condone one computational error) A1 cao
$\begin{array}{r} 679 \\ \underline{28} \\ 5432 \\ \underline{13580} \\ 19012 \end{array}$	or	$\begin{array}{r} 28 \\ \underline{679} \\ 252 \\ 1960 \\ \underline{16800} \\ 19012 \end{array}$					
(b)	$570 \div 50$	12	2	M1 $570 \div 50$ or 11.4 or 11 seen A1 cao			
(c)	$570 \times \frac{110}{100}$	627	3	M1 for $\frac{110}{100} \times 570$ or $570 \div 10$ or 57 seen M1 (dep) $570 + “57”$ (or M2 for 570×1.10) A1 cao			

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4 (a)		Correct drawing	2	B2 Condone hidden detail shown with solid lines, or missing lines on front face (B1 for correct plan and side elevation, cross-section correct with depth > 1 cube, or one added cube)
		(b) Correct drawing	2	B2 Ignore relative proportion, do not accept a rectangle when one side > 1.5x other side (B1 one shape only)
5 (a)		Points plotted	1	B1 ± 1 full mark (2 mm square)
		(b) Positive	1	B1 cao
		(c) $35 < \text{answer} < 40$	2	B2 ft from a single line segment with positive gradient ± 1 full (2 mm) square B1 lbf must pass through (5, 5) (5, 15) and (55, 35) and (55, 45)
6		$C = 1000(n + 3)$	3	B3 for $C = 1000(n + 3)$ oe such as $(n + 3) \times 1000$ (B2 for correct RHS or $C = n + 3 \times 1000$, $C = 1000n + 3$ etc) (B1 for $C =$ some other linear expression in n or $n + 3 \times 1000$, $1000n + 3$ etc) NB $C = n$ scores no marks

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7	(a)	$p^3 - 3p^2$	2	B2 cao (B1 for p^3 or $3p^2$ seen in working, ignore signs)
	(b)	$y(y+5)$	2	B2 for $y(y + 5)$ or $y \times (y + 5)$, (B1 for $y(ay + b)$ where $a, b, b \neq 0$ are numbers or $y + 5$ seen on its own, or part of an expression)
	(c)	$2x(x + 3y)$	2	B2 cao (B1 for $2(x^2 + 3xy)$ or $x(2x + 6y)$ or $2x(\dots)$)
	(d)	$x^2 - 2x - 15 = (x - 5)(x + 3)$	5, -3	2
8		question + response boxes oe	2	1 st aspect: one question with time period (eg each day); ignore other questions 2 nd aspect: response list (at least two), no overlapping 3 rd aspect: some mention of units (eg hours or number of pieces) in either question or responses Award B2 for all these aspects, or B1 for just two aspects

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9	$(4 \times 3) \times 11 \div 2$	66cm^3	4	M2 for $4 \times 3 \times 11 \div 2$ (M1 for any three of these) A1 cao numerical answer of 66 B1 (indep) cm^3 with or without any numerical answer
10 (a)		Correct reflection	2	B2 cao (B1 for reflection in a line other than $y = 2$)
(b)		Reflection in $y = x$	2	B2 cao (B1 for “reflection” or $y = x$) NB: inclusion with other transformations get B0
11 (a)	$9 - 2x = 3x + 6$ $9 - 6 = 3x + 2x$ $3 = 5x$	$\frac{3}{5}$	3	B1 for $3x + 6$ seen OR $3 - \frac{2}{3}x = x + 2$ M1 for correct rearrangement of 4 terms or $3 = 5x$ A1 for $\frac{3}{5}$ oe
(b)		$-3, -2, -1, 0, 1$	2	B2 (B1 for 4 correct integers and not more than one incorrect integers or omissions)

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12 (a)	$1 + 2 + \frac{14}{35} + \frac{15}{35}$	$3\frac{29}{35}$	3	<p>M1 for attempt to convert to fractions with common denominator eg two fractions, denominator of 35</p> <p>A1 for correct conversion: $\frac{14}{35}$ and $\frac{15}{35}$ seen</p> <p>(oe)</p> <p>A1 cao</p> <p>OR</p> <p>Attempt to convert decimals: must use at least 2dp</p> <p>M1 0.4 + 0.42 (or 1.4 + 2.42) or 0.4 + 0.43 etc</p> <p>A1 3.82, 3.83, etc</p> <p>A1 3.82857 (ie at least 5 dp)</p>
(b)	$\frac{2}{5} \times \frac{3}{7} = \frac{6}{35}$	$\frac{6}{35}$	2	<p>M1 For 6 or multiplication of top or bottom</p> <p>eg $\frac{6}{35}$, $\frac{840}{4900}$</p> <p>A1 cao</p>
13	$\frac{10}{6} \times 4.8$	8	2	<p>M1 for $4.8 \div 6 \times 10$</p> <p>A1 cao</p>
14		$1^{\text{st}}, 3^{\text{rd}}, 4^{\text{th}}$	3	B3 (B1 for each, -1 each extra)
15	$x + 0.35 + 0.15 + x = 1$ 0.25×400	100	4	<p>M1 for $x + 0.35 + 0.15 + x = 1$ oe, or $0.5 \div 2$</p> <p>M1 0.25 seen</p> <p>M1 0.25×400</p> <p>A1 cao accept 100 out of 400 (in words)</p> <p>SC B1 for $\frac{100}{400}$</p>

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16 (a) (i) (ii)		40	2	B1 cao B1 reason in words, linking radius and tangent (edge insufficient)
		Identifies angle between radius and tangent as 90° 50° Angle at the centre is twice the angle at the circumference.	3	May be in working or on diagram M1 $2 \times 50^\circ \div 2$ A1 50° B1 reason in words
(b) (i) (ii)	$2 \times 50^\circ \div 2 =$			
17 (a)		$\frac{1}{4}$ on LH branch	2	B1
		$\frac{2}{3}, \frac{1}{3}, \frac{2}{3}$ on RH branches		B1
		$\frac{7}{12}$	3	M1 for $\frac{3}{4} \times \frac{2}{3}$ or $\frac{1}{4} \times \frac{1}{3}$ from their tree diagram M1(dep) for sum of two correct products A1 for $\frac{7}{12}$ oe
(b)	$\frac{3}{4} \times \frac{2}{3} + \frac{1}{4} \times \frac{1}{3} = \frac{6}{12} + \frac{1}{12}$			
(c)		14	3	M1 for $\frac{3}{4} \times \frac{1}{3} \left(= \frac{3}{12} \right)$ or $1 - \frac{9}{12}$ M1 for $21 \times \frac{12}{3} \times \frac{1}{4} \times \frac{2}{3}$; ft from their tree diagram; must be from a product A1 cao

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18 (a)		0.8333...	1	B1 for 0.8333... oe or 0.83
(b)	eg $x = 0.3636\dots$ so $100x = 36.3636\dots$ $99x = 36$ $x = \frac{36}{99} = \frac{4}{11}$		3	M1 for $100x = 36.36\dots$ M1 dep for subtraction of both sides A1 for $\frac{4}{11}$ from correct proof [SC: B1 for $\frac{36}{11}$ or $4 \div = 0.3636$ showing remainders in divisions]
19 (a)		28	4	B1 ft from (a) using “ <i>k</i> ”, dep on at least M1
(b)	$24 = \frac{84}{r}$	3.5	2	M1 ft from (a) dep on at least M1 for putting $p = 24$ into their equation A1 oe eg $\frac{84}{24}$
20 (a) (i)		1	1	B1 cao
(ii)		9	1	B1 cao

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21 (a) (b)		5	2	M1 for $\frac{76}{800} \times 50$
		Correct response and correct reason	2	A1 for 4.75 or 5 M1 for Yr 7 boys = Year 11 girls $\times 2$ A1 for 6.875 and 3.43745
22	$\frac{\frac{4}{3}\pi(3x)^3}{\pi(4x)^2} = \frac{4}{3} \times \frac{3^3}{4^2} x$	$\frac{9x}{4}$	3	M1 for substitution in a correct formula, condone missing brackets M1 for a correct equation to find the depth including h and brackets A1 for $\frac{9x}{4}$ oe
23 (a) (b)	$PR = -2\mathbf{a} + 2\mathbf{b}$	$-\mathbf{a} + \mathbf{b}$	2	B1 $PR = -2\mathbf{a} + 2\mathbf{b}$ or $\mathbf{a} + \mathbf{b}$ oe B1 oe
	$OQ = 2\mathbf{a} + 2\mathbf{b}$ $OX = OP + PX = 2\mathbf{a} - \mathbf{a} + \mathbf{b} = \mathbf{a} + \mathbf{b} = \frac{1}{2}OQ$			2 B1 $OX = OP + PX$ B1 equates $OX = \mathbf{a} + \mathbf{b}$ with $\frac{1}{2}OQ$